Safe Work Practice: Handling Compressed Gases in Medical Clinics

Purpose

To establish a standardized procedure for the safe storage and handling of compressed gases at the clinic.

Scope

This procedure applies to all staff in clinics where compressed gases, to be used in a free-standing single cylinder setup, are stored and handled.

Hazards

- **Crush Injuries:** Compressed gas cylinders are disproportionately heavy compared to their size. Dropping a cylinder onto an unprotected foot can cause broken bones, contusions, and other soft tissue injuries.
- **Contents Under Pressure:** If a cylinder is dropped or punctured, or if its valve is opened without a proper connection to a gas delivery system, the resulting release of pressure may forcefully launch the cylinder into the air. The path of projectile cylinders is often unpredictable.
- **Asphyxiation:** Some medical gases can reduce the oxygen content in air (i.e. simple asphyxiants, such as nitrous oxide) or interfere with the body's ability to use oxygen normally (i.e. chemical asphyxiants, such as carbon dioxide). Both can lead to suffocation.
- **Fire and Explosion:** Some medical gases (e.g. oxygen) are flammable. If a small leak is present in a gas system, a fire or explosion may occur if a source of heat is present nearby (e.g. electrical outlet, lighter, or space heater).

Safe Work Practices

Storage

- Post a "no smoking" sign outside of any location where flammable gases are kept.
- Secure cylinders using appropriate containers, racking, cages, or chains. Cylinders that are not in use can be secured as a group, and stored using the "interlock" method if sufficient cylinders are present (OHSR G5.38). Always store cylinders in an upright position.
- Fire extinguishers should be secured with a wall-mounted bracket and not kept directly on the floor.
- Store empty cylinders separately from full and partially used cylinders.
- Store cylinders with the safety cap on, if present.
- Keep surplus cylinders in a designated storage location that is ventilated, temperature regulated, and accessible only by staff.

Selection and Handling

- When attaching a cylinder:
  - Cylinders must be clearly labelled with their contents. Cylinders with missing or illegible labels must not be used. Do not rely on the colour of cylinders for identification, because this may vary between suppliers.
  - All parts of the cylinder must be in good condition, with no damage, denting, or corrosion. Return cylinders with obvious damage to the supplier.
  - Select cylinders with the smallest appropriate size for the application.
  - Leave the safety cap on until just before use, and between uses if possible.
  - If a cylinder cannot be opened without force, mark it as defective. Do not use it.
  - Avoid manually carrying cylinders. Use carts or trolleys where possible.
  - For moving larger cylinders for a short distance (e.g. a few feet), it is possible to tilt an upright cylinder slightly and roll it on its edge towards the destination. Do not over-tilt or move the cylinder quickly in the tilted position, and ensure the safety caps are on during this movement.

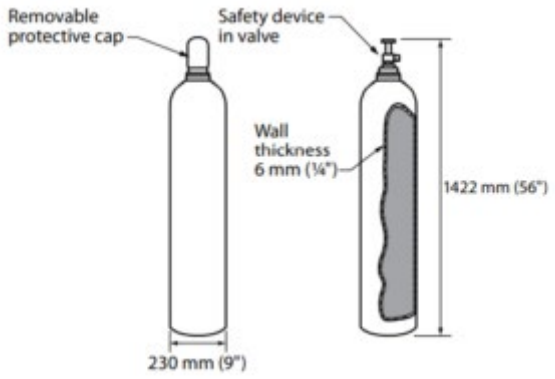

Figure 1 - Cylinder safety features. © 2021 Camosun College. Licensed under CC BY 4.0.

- When removing a cylinder:
  - Keep a slight positive pressure in cylinders: do not let them empty completely.
  - Firmly close empty cylinders and mark them as empty. Twist on the safety cap, if present.
  - If the cylinder has enough pressure to be used again, mark the approximate amount remaining on the cylinder.
  - Do not attempt to refill an empty cylinder.

Other Precautions

- Mark gas hoses and other devices that are attached to the cylinder with the chemical name or symbol, and use them for that gas only to avoid mixing chemicals.
- During clinic hours, ensure at least one person is available who understands how to safely set up the cylinder, use it for its clinical purpose, and store the cylinder after use.
- The proper leak response depends on the type and volumes of gas present, and each clinic should develop a set of leak response procedures. For most gases, the initial response should include evacuating the area and contacting the supplier.
- Post the leak response procedure and this Safe Work Practice for Handling Compressed Gases, near the cylinder area.
- Order a replacement cylinder when the first one is running low, so you don't store extras.

First Aid Treatment

Workers who are injured while handling compressed gas cylinders must report the injury to their employer and seek first aid. The worker should follow the clinic's established first aid reporting procedures to ensure proper documentation of the injury is kept.

- If a cylinder is dropped onto the body:
    - Apply a cold pack to the injured area.
    - Seek medical attention if there are signs of swelling, extreme pain, or limited range of motion.
- If the skin is cut or broken during cylinder handling:
    - Treat the wound as a normal cut.
    - Consider tetanus immunization if the cylinder appears dirty or rusted.
- If hit by a pressurized stream of gas:
    - Inspect the skin for signs of damage.
    - Monitor for signs of illness and seek urgent medical attention if needed. Gas that enters the body or bloodstream through a pressurized jet can cause extreme illness and may be fatal, depending on the type and volume of gas.
- If exposed to leaking gas:
    - Remove the worker from the area without risking further exposure to do so. If unable to do so safely, contact emergency services.
    - Monitor for signs of illness and seek urgent medical attention if the worker is vomiting, dizzy, confused, lethargic, having trouble breathing, or having vision problems.
    - If clinically appropriate and within the provider's scope, offer oxygen therapy.

Training

Managers must ensure that employees who handle or change compressed gas cylinders review and understand this document before completing these tasks. Employees who work around compressed gas cylinders, but do not handle or change the cylinders, should also review and understand this document.

Annual Review

This policy and procedure will be reviewed and updated as needed.

References

- Workplace Hazardous Materials Information System 2015 (WHMIS).
- Safety Data Sheets for Common Healthcare Gases.
- WorkSafeBC Occupational Health and Safety Regulation – Substances Under Pressure.
- College of Physicians and Surgeons of BC – Medical Gas Standards (Free-Standing).

Approval

Employer/Manager:	Date: